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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,743	03/27/2001	Kazumi Matsumoto	15.39/5752	4007

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EXAMINER

GHYKA, ALEXANDER G

ART UNIT PAPER NUMBER

2812

DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/818,743

Applicant(s)

MATSUMOTO ET AL.

Examiner

Alexander G. Ghyska

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE of 9/22/03.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

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Alex Ghyska

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 15-17.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. Claims 9-21 are now under consideration.

Claim Rejections - 35 U.S.C. § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 9-21 are rejected under 35 U.S.C. 103(a) as being obvious over Ushiyama et al (US 6,245,659) in view of Morozumi Yukio JP 11-074352 ('Morozumi').**

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5. The present claims generally require manufacturing a semiconductor device comprising forming a first silicon oxide layer using a polycondensation reaction of a silicon compound and hydrogen peroxide; forming a second silicon oxide layer including an impurity therein; annealing the first silicon oxide layer and the second silicon oxide layer at a temperature in the range of 600 to 850 degrees Celcius and forming a pad section over the first silicon oxide layer and the second silicon oxide layer, the pad section including a wetting layer and a wiring layer.

6. Ushiyama et al disclose forming a first silicon oxide layer by reacting a silicon compound such as monosilane or disilane with hydrogen peroxide at a temperature of 0-20 degrees Celcius by a reduced pressure chemical vapor deposition. See column 11, lines 30-55. Moreover, Ushiyama et al disclose forming a second porous silicon oxide layer by reacting a silicon compound with at least one oxygen and a compound including oxygen, and a compound including an impurity such as phosphorus. See column 11, line 65 to column 12, line 30. Ushiyama et al also discloses an anneal treatment for the silicon oxide. See column 12, lines 30-50. Furthermore, Ushiyama et al discloses forming a wetting layer on the dielectric layer, forming a metal wiring layer over the wetting layer and forming a pad section by patterning the wetting layer and the metal wiring layer. See column 14, lines 40-65 and column 16, lines 35 -65. Ushiyama also disclose a multilayer wetting layer comprising two aluminum films as required in present Claim 19.

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7. Therefore, Ushiyama et al disclose all of the presently claimed limitations with the exception of the anneal temperature of the first and second silicon oxide layers of 600 to 850 degrees Celcius.

8. Morozumi et al disclose a process for forming an interlayer insulating film which comprises a process wherein a hydrogen containing silicon compound and hydrogen peroxide are reacted with each other by a chemical vapor deposition method to form a first silicon oxide film 22 , a process wherein at least one kind of the compound or the element among a silicon compound, oxygen and an oxygen containing compound and an impurities containing compound are reacted with each other by chemical vapor deposition to form a second porous silicon oxide film 24 , and a process wherein an annealing treatment is performed at a temperature of 600 to 850 degrees Celcius. See the abstract of Morozumi.

9. It would have been obvious for one of ordinary skill in the art to use the anneal treatment temperature as disclosed by Morozumi in forming the two layer interlayer insulating film of Ushiyama, as both references pertain to forming two layer silicon oxide dielectric films. The choice of temperature is considered to be within the level of skill for a practitioner in the art, and its slight variation is not considered a patentable difference. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *In re Aller* , 105 USPQ 233 (1955). Moreover, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the

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art. See *In re Antoine*, 195 USPQ 6 (CCPA 1977). In the present case, Morozumi shows that the claimed temperature ranges are known in the art to anneal the two silicon dioxide layers as disclosed by Ushiyama, and therefore it would be obvious for one of ordinary skill in the art to use the claimed temperature range and arrive at the claimed limitations. Therefore, a *prima facie* case of obviousness is established.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday, Tuesday, Thursday and Friday from 8:30 AM to 7:00 PM .

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (703) 308-3325. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.

AGG

January 29, 2004

**ALEXANDER GHYKA
PRIMARY EXAMINER**

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